

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
23 June 2005 (23.06.2005)

PCT

(10) International Publication Number  
**WO 2005/056812 A3**

(51) International Patent Classification<sup>7</sup>: **C07C 50/28**,  
A61K 31/122

(21) International Application Number:  
PCT/US2004/040565

(22) International Filing Date: 3 December 2004 (03.12.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/527,513 5 December 2003 (05.12.2003) US

(71) Applicant (for all designated States except US): **ZYMES, INC.** [US/US]; 452 Albany Court, Goleta, California 93117 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **LIPSHUTZ, Bruce H.** [US/US]; 452 Albany Court, Goleta, California 93117 (US). **BERL, Volker** [DE/FR]; 2, Rond Point de l'Esplanade, 67000 Strasbourg (FR). **SCHEIN, Karin** [DE/DE]; Krongasse 17, 67065 Kudwigshafen (DE). **WETTERICH, Frank** [DE/DE]; Hans-Willmann-Str. 11, 67157 Wachenheim (DE).

(74) Agents: **ESKER, Todd, W.** et al.; Morgan Lewis & Bockius LLP, 2 Palo Alto Square, Suite 700, 3000 El Camino Real, Palo Alto, California 94306 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

(88) Date of publication of the international search report:  
15 September 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PRACTICAL, COST-EFFECTIVE SYNTHESIS OF UBIQUINONES

(57) Abstract: The present invention provides a convergent method for the synthesis of ubiquinones and ubiquinones analogues. Also provided are precursors of ubiquinones and their analogues that are useful in the methods of the invention. The invention further provides an improved method for the carboalumination of alkyne substrates.



WO 2005/056812 A3